

THE TERMITES OF NEVADA

BY S. F. LIGHT

Department of Zoölogy, University of California, Berkeley

Very little is known of the termite fauna of Nevada. I know of but two species reported in the literature, *Termopsis nevadensis* by Hagen (1893) from the "western border" (near Lake Tahoe) and *Reticulitermes tibialis* by Banks and Snyder (1920) from "Nevada" (Elko?).

The records of the Termite Investigations Committee add somewhat to the picture. *R. hesperus* Banks was collected by C. R. Anderson at Big Canyon (Washoe County?). A. L. Pickens and O. L. Williams of the Termite Investigations Committee staff found the three above mentioned species common in and about Carson City and C. M. Murphy has recently sent us a collection of *R. tibialis* from Montello in the north-eastern part of the state very near the Utah border and one from Granite Point.

A recent trip to southern Nevada for the Termite Investigations Committee with a view to estimating the probabilities of termite damage at the Boulder City site and the type of construction indicated furnished an opportunity to make a hasty collection of the termites of the region and to get some picture of their biology and distribution.

Although but parts of two days were spent in the field results of considerable interest were attained. Six species were collected as follows: *Kaloterme*s (*Neoterme*s) *simplicicornis* Banks; *Reticulitermes tibialis* Banks; *Amiterme*s *arizonensis* Banks; *Amiterme*s *coachellæ* Light; *Amiterme*s *wheeleri* Des-neux (sensu Light 1930); *Amiterme*s *californicus* Banks. Of these six species only *R. tibialis* had previously been known from Nevada and these collections extended the known northerly range of each of the five species by from one hundred to two hundred miles.

Neither *Kaloterme*s *minor*, *Kaloterme*s *hubbardi*, nor *Heteroterme*s *aureus* was found, although numerous situations favorable for each of them were investigated. I have found all three of these species abundant in the vicinity of Yuma and *K. hubbardi* and *Heteroterme*s were found by Pickens in the Colorado River Valley near Blythe. It would be of considerable

interest to trace the northerly limits of range of each of them in the Colorado River Valley.

The termite fauna of Nevada includes, therefore, at least eight species. This is a purely geographical assemblage of species and without any ecological unity. We may expect to find *Termopsis nevadensis* confined to the moister, forested areas of the northwest. *R. hesperus* is probably restricted also by the moisture factor but with a wider range due to its subterranean habits. *R. tibialis* may be expected to occur in local areas in all parts of the state where moisture conditions are more or less intermediate between those requisite to the existence of *R. hesperus* and those found in the desert. Even here they will appear in wash associations as seen near Las Vegas (Winterwood Ranch).

The termite fauna of southern Nevada consists largely of species common to the Mohave and Colorado deserts, species which will almost certainly be found in the unknown fauna of the northern half of Arizona and most of which do occur in the fauna of southern Arizona. It seems safe to predict that this fauna will be confined to the small southern portion of the state whose meteorological and topographical features are in agreement with those more southerly regions.

One especially interesting outcome of the trip was the discovery of a nest of the recently described species *Amitermes coachellæ* Light (1930) containing not only the hitherto unknown alates but a physogastric queen with eggs and early instars. This was my first finding of *Amitermes* alates in the colony and the first for this whole area. The only other nest series known to me, unreported as yet, were taken in the Davis Mountains in Texas. As for the physogastric queen, I believe this is the first one taken for this genus in North America, if not in Pan-America.

Kaloterme (*Neoterme*) *simplicicornis* Banks is extremely abundant in the washes and mesquite grown sinks of the Las Vegas Basin (2600 feet) and in the Colorado River Valley (Vegas Wash) some six miles above the Boulder Dam site. Here as elsewhere the buried dead branches and roots of mesquite are its most important reservoir. In one area, near the Winterwood Ranch, however, living clumps of shadscale

(*Atriplex* sp.) were practically all infested with this species which seems to obtain its moisture from the juice of the plant which its activity destroys. Whether the termite groups in such plants are separate colonies is a moot question as yet. It is common to find the termite workings in dead plants occupied by ants (*Cremastogaster*). If they do not move out with the failing of the plant juices it seems probable that the weakened termite group is finished off by the invading ants.

I am using the older subgeneric name (*Neotermes*) but in a paper soon to go to press a new subgenus is erected to receive this unique species.

One of the puzzling points in the biology of this most interesting species is the location of the reproductives of the colony. Although several hundred colonies have been examined no supplementaries have been found and in only one case, a colony hastily examined near Tucson, has a royal pair been found. This condition held in the Nevada colonies, no royal pairs or supplementaries being seen in the many colonies opened.

Equally puzzling has been the point of location of the primary royal cell and pair of incipient colonies since heretofore none of these has been found. It was interesting to find two such royal pairs of incipient colonies. They were in cells in the base of a dead clump of *Atriplex* in the wash near Winterwood Ranch. The absence of eggs or young indicated that they were from this year's swarm, which had evidently emerged here, no alates being found in the colonies, although in the Vegas Wash the colonies were crowded with alates.

Reticulitermes tibialis Banks was taken both in the vicinity of Las Vegas and in the Vegas Wash near river level. Near Las Vegas it was found in dead cottonwood roots near an irrigation ditch and in Las Vegas signs of its attacks on poles were observed. Near the Winterwood Ranch it was common in wood buried in drifted sand on the edge of the wash. In the Vegas Wash it was common in partly buried drift wood. The abundant drift wood along the banks of the Colorado showed no signs of termite attack whether because of frequent flooding or because the extremely fine silt is unfavorable.

Amitermes arizonensis was encountered in its characteristic situation on the sloping rocky approaches to the mountains

which rim the basin in which Las Vegas lies. Signs of its activities were seen in the form of covered ways over desert shrubs and the light areas on shrubs due to its eating off the thin, weathered, outer layers. Several workers and a soldier were taken on a hillside shrub (? *Encelia*) growing in a tiny soil pocket in a crevice of the solid rock of a gulch just back of the Frenchy Mine.

Amitermes coachellæ Light (1930), recently described from San Gorgonio Pass and the upper Coachella Valley, was the only termite found on the proposed site for Boulder City. It was also taken near the Winterwood Ranch in the Las Vegas Basin where it was attacking dead mesquite branches partly buried in sand.

The single collection taken at the Boulder City townsite was from a large colony in a well formed nest similar to that discovered by Castle in the Coachella Valley (Light 1930). The nest was buried from six to fifteen inches deep under a broad, flat, partly buried stone in a small, sandy draw. The galleries immediately below the stone and attached to it were crowded with the hitherto unknown alates of this species and last instar reproductive nymphs. Scattered smaller chambers contained young of the first three instars and one contained eggs. But few workers were present at this level. An intermediate nest contained many workers and some alates and reproductive nymphs of various stages. Only a single soldier was taken here and none immediately below the stone. The lowest nest, some fifteen inches below ground, contained large numbers of soldiers and numerous workers but no alates or nymphs were seen. Every gallery when opened was found guarded by one or several soldiers. In its center in a broad flat royal cell was a physogastric queen with an abdomen about 15 millimeters long and 4.5 millimeters in diameter. This is the first queen of this species taken, and the first, I believe, for the genus in North America if not in both Americas.

Soldiers of the *Amitermes* species are notably few in proportion to workers, at least in the foraging groups from which collections are ordinarily made. This finding shows them to form a higher percentage of the colony than had been believed,

their function being apparently largely the guarding of the royal pair.

The smallest American species of *Amitermes*, very similar to *A. coachellæ* in type of soldier mandibles but very much smaller than that species, was described by me (Light 1930) under the name *A. wheeleri* Desneux on the basis of determinations by Banks (1920). Recent studies of Banks' material and one of Desneux's cotypes leave little doubt that it is an undescribed species quite different from Desneux's species which is probably the *Amitermes californicus* of Banks (1920). This species will be named and the hitherto unknown alates described in a forthcoming revision of the genus. Until such time it seems convenient to retain the older name. This species was taken but once in Nevada, on a down fence post partly buried in sand near the Winterwood Ranch.

Amitermes californicus Banks is probably a synonym of *A. wheeleri* Desneux as pointed out above, but pending final investigation of type material Banks' name may be retained. This species was not found in Las Vegas or vicinity but was very abundant in a dryer, more gravelly wash emptying into the Vegas Wash at an elevation of about 800-900 feet. Late reproductive nymphs were present but no alates.

PRELIMINARY NOTE ON PÆDOGENESIS IN A CECIDOMYIID

BY F. D. KLYVER

San Mateo Junior College, San Mateo, California

The writer's attention was attracted to an abundant infestation of *Lupinus nanus* by an undetermined cecidomyiid near South San Francisco in March, 1931. Most of the lupine plants extending over a considerable area had several to many of their leaves distorted to form simple leaf-galls. These were formed by the margins of the opposite sides of a leaflet remaining firmly in contact, frequently along their entire length, the blade of the leaflet then expanding to form a bluntly pointed spindle-shaped gall, which turned pale yellow and translucent.

Several hundred heavily infested leaves were taken to the laboratory and placed loosely in covered containers for observation on March 19 (Lot A). A second lot (Lot B) was obtained